eyeheight

dk3

SDI luminance keyer

user manual

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I System Overview

The DK-3 is a Luminance Keyer Unit mostly used for keying captions and graphics. These units are commonly used in transmission and post production. The main features are as follows:

- Full 10 Bit luminance Keying.
- Auto Transition (Timed Fade-in) control.
- Key Gain and lift controls.
- Multiplicative, Additive, Self Key and colour fill modes.
- Key Mix and 8 Wipe Transitions.
- Fill and Key position controls
- Preview output with safe area generator built-in.
- Up to +/-32uS user definable synchronisation window for Inputs
- Transparent to all embedded signals
- Automation controllable
- EDH re-insertion
- 6 user memories
- GPI inputs to enable take to A or take to B plus 6 Scripted GPI's
- Relay outputs to indicate on air source either, A, B, Matte or Black

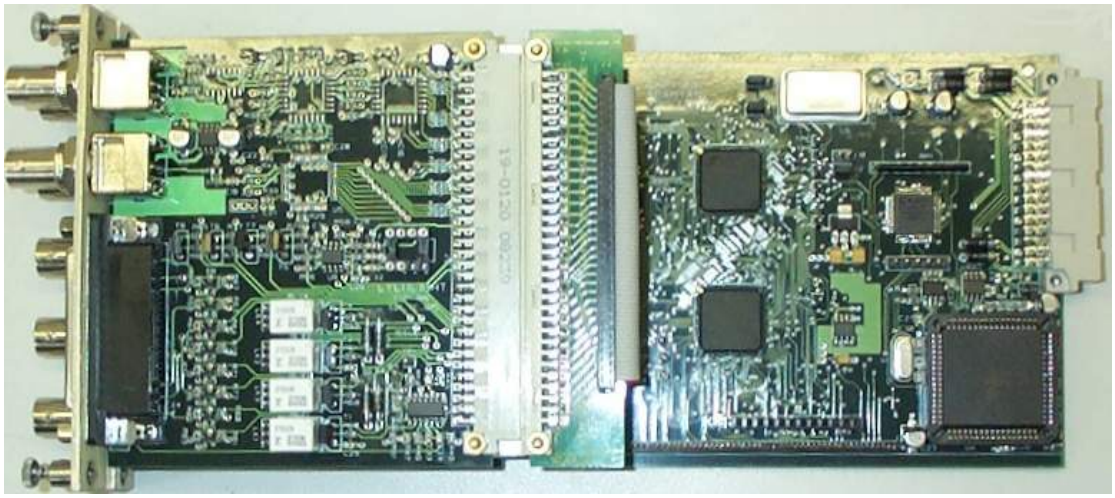

Figure 1 The DK-3 keyer module

I.I Applications for the DK-3

Applications for the DK-3 include the following:

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- Down Stream and Up Stream keyers in transmission systems.
- Offline Captioning.
- Presentation and Master Control systems (Eyeheight PresTX).
- Bug Keying.

The DK-3 will be used in a situation where a device such as a caption generator is required to overlay captions onto a video background.

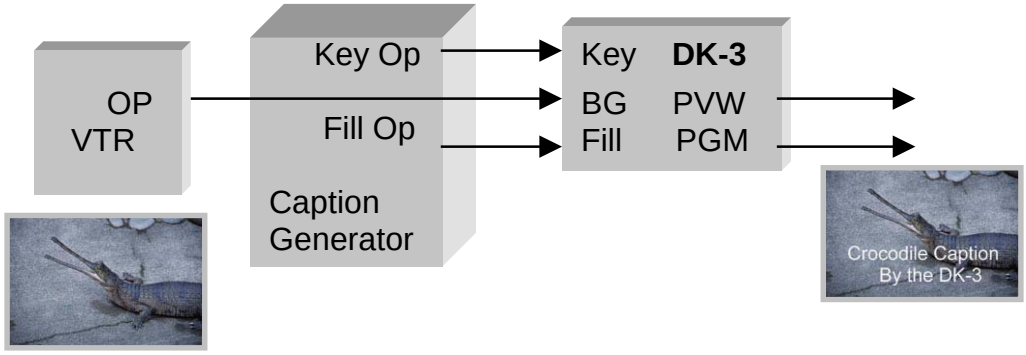

Figure 2 The DK-3 configured for use with a caption generator

1.2 Associated Equipment for the DK-3

The DK-3 is a module and requires both a chassis and a control surface to function.

1.2.1 Chassis Types

- **flexiBox** is a 1RU chassis. The order code is FB-9. This will hold a maximum of 3 DK-3 Modules with “Hot Swap” redundant PSU option and “Hot Swap” DK-3 modules.
- **maxiBox** is an alternative low cost 1RU chassis. The order code is MX-9. This also will hold a maximum of 3 DK-3 modules but it has no redundant PSU option and the DK-3 units must be factory fitted.

Figure 1-3 flexiBox with flexiPanel fitted

1.2.2 Control Surfaces

- **flexiPanel** is a IRU control surface that fits on the Front of a 1RU flexiBox. The order code is FP-9. A FlexiPanel can also be used in conjunction with

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a miniBox, in this case the extra accessory (Order code RR-9) will be required

- **FP-10** is a desk mounting control surface (Order code FP-10). This unit is a modular unit which can be used in conjunction with the units below.

Figure 1-4 FP-10 desktop modular panel

Figure 1-5 VP-10 desktop modular T-Bar

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2 Installation

2.1 Installation of the DK-3 product

If this unit is already pre-installed in a flexiBox (FB-9), or a maxiBox, with either a local or a remote panel from the factory then refer to the "Hardware Installation Guide" which will be enclosed with the system. If this unit is pre-installed in a miniBox (MB-9), then also refer to the "Hardware Installation Guide" which will be enclosed with the system

If this unit has been ordered separately, we assume here that you already have a flexiBox system with a Flexipanel and that the flexiBox has at least two spare slots above each other for the DK-3 card.

2.2 Installing the DK-3 into a flexiBox

To install the DK-3 into a flexiBox it is desirable (but not necessary) to power down the flexiBox. Follow these instructions.

On the rear of the flexiBox are 6 slots for Products. Remove any pair of spare blanking plates one above another. There are 2 off M2.5 Screws, which require unfastening for each blanking plate.

Slide the Product PCB into the spare slots and firmly push it "home".

Use the two thumbscrews to fasten the unit in place. Take care that the ribbon cable for the upper circuit board stays attached to the lower board.

Now refer to the "GeNETics User Guide". If your system consists of a single flexiBox with a single flexiPanel then refer to the section titled "flexiPanel Auto Set-up". If your system is part of a network with more than one flexiPanel then refer to the section titled "flexiPanel Manual Set-up". This will guide you through acquiring your product as a device on the flexiPanel.

2.3 Connecting Video to an DK-3

A Typical Connection diagram for the DK-3 is shown below. All signals are SDI:

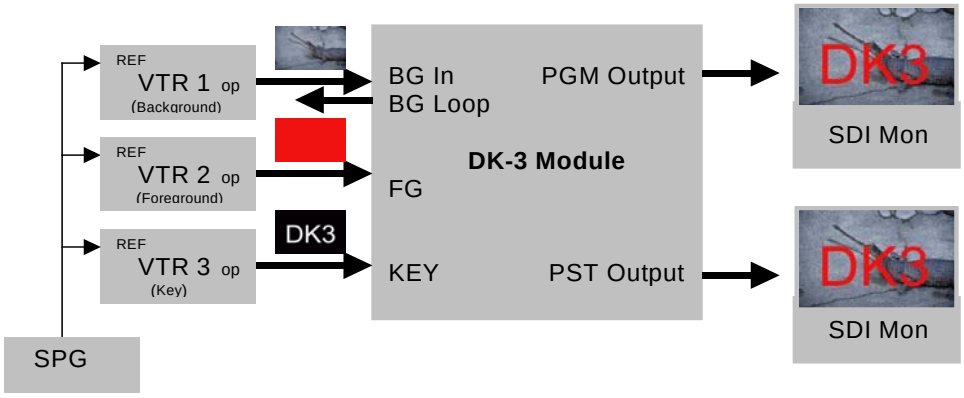

Figure 6 Typical connections for a DK-3 Module

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In the above diagram the SPG provides a reference such that VTR1,VTR2 and VTR3 give synchronous output video. The FG and KEY input must be within +/- 32uS of the BG for the DK-3 to operate correctly. The Preview output will always show the keyed result, whereas the programme output will only show the keyed result if it is faded on.

The DK-3 Module has a number of user configurable jumpers which can change the function of the 5 SDI BNC Connectors. These are shown along with their default configuration below. These jumpers are found close to the BNC Connectors.

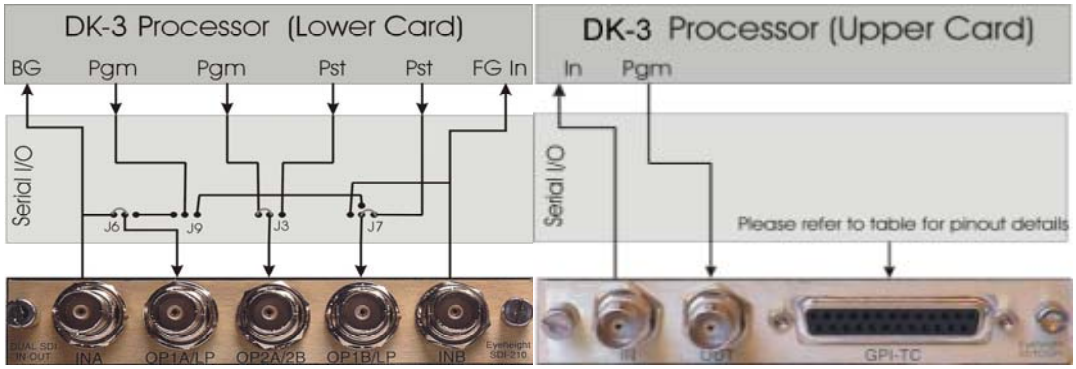

Figure 7 The DK-3 connections and internal links

2.4 Connecting Panels to the DK-3

The DK-3 may be operated using a FP-9 Flexipanel locally mounted. For a more operational environment the DK-3 may be supplied with a desk mounting FP-10 unit and also possible a VP-10 Desk mounting Video T-Bar manual transition unit. For detailed information on connecting remote panels refer to the section “Connection of Remote Panels to a flexiBox” in the geNETics Hardware Installation Guide.

Below is shown a typical system consisting of an DK-3 in a flexiBox controlled by an FP-10 and a VP-10.

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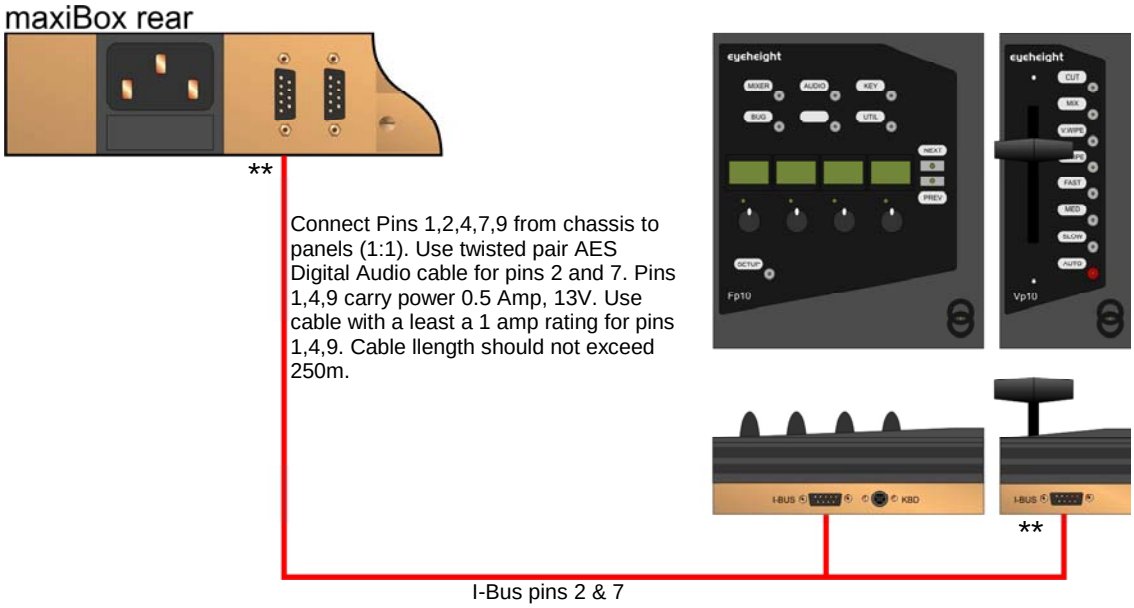
maxiBox rear
**
Connect Pins 1,2,4,7,9 from chassis to panels (1:1). Use twisted pair AES Digital Audio cable for pins 2 and 7. Pins 1,4,9 carry power 0.5 Amp, 13V. Use cable with a least a 1 amp rating for pins 1,4,9. Cable llength should not exceed 250m.
eyeheight
FpT0
eyeheight
VpT0
I-BUS
KBD
I-BUS
**
I-Bus pins 2 & 7

** The I-BUS Network requires terminating with 100 Ohms at each extreme end of the network. Ensure that this is done either by an external 100 ohm resistor OR ONE Panel/Product at each end has the termination set. See the "Genetics User Guide" Under the sections "Flexipanel Power/I-BUS Jumpers".For the 4RU Panels see “4RU Panel (FP-10) Jumpers for I-BUS” and “4RU Panel (VP-10, SW-10, AP-10) Jumpers for I-BUS” . Alternatively The termination can be set on a Product (ie the MW-2 module). Information about this is given in this manual.

Figure 2-8 I-Bus Connections and Termination

N.B. From 1/10/02 Eyeheight introduced a change in the flexiBox Chassis. Most versions now have two 9 way connectors on the rear labelled “I-Bus” and “D-Bus”. The “I-Bus” connector is the same as the previously labelled “Can-B” connector. Although a maxiBox is shown in this diagram the same arrangement applies for a flexiBox chassis.

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3 Operation

3.1 Manual control of the DK-3

Manual Control of the DK-3 is done using one or more of the following control surfaces:

- The 1RU FP-9 Flexipanel.
- The FP10 Desk mounting Panel
- The VP-10 Desk mounting Video T-BAR Manual Transition Panel.
- The TK-10 Desk mounting Auto Transition Panel.

The FP-9 and the FP-10 have identical manual control systems. (The FP-10 is simply a desktop version of the FP-9). The VP-10 brings further functionality to the unit in the T-BAR manual transitions and the other switch functions.

The DK-3 is, as are all genetics modules, controlled using a set of MENUS. Each of these menus contains up to 3 parameters that are adjusted using the rotary digipots. The Menus define all of the adjustable operational parameters in the DK-3. Pressing the rotary digipots brings the parameter to its default value. Device selection is done using the device select switches which, when pressed, will offer the name of the device in the LCD Window. Modules can be acquired and then de-acquired using the set-up switch. For a full description of the operation philosophy of the geNETics system refer to the “geNETics User Guide” (section “Operation of the flexiPanel”)

A full list of the Menus and their functions are given in section 3 of this chapter.

3.2 Automation Control of the DK-3

Automation of the geNETics products is achieved via an RS422 port.** This port is marked RS422 on the rear of a flexiBox. For the port to work a flexiPanel MUST be connected locally on the front of the flexiBox.

Automation control of the DK-3 can be done using two protocol methods:

- geNETics Automation Protocol.
- PresTX Automation Protocol.

Genetics protocol is described in detail in the “GeNETics User Guide” section titled “Automation Protocol on the geNETics Platform”. The menu list in section 3 of this chapter contains the data information for the protocol.

PresTX Automation Protocol is used only for the PresTX Presentation Mixer and channel branding system. In this case an AU-2 Automation card is also required. Refer to the PresTX Product manual

**On most flexiBoxes later than 1/10/02 the RS422 port has been replaced by a “D-Bus” Port. The D-Bus port is for High Speed data transfer and is not used for serial control. In order to achieve serial control of any products on an I-Bus network Eyeheight Ltd have developed a RS232→I-bus converter “dongle”, (DG-

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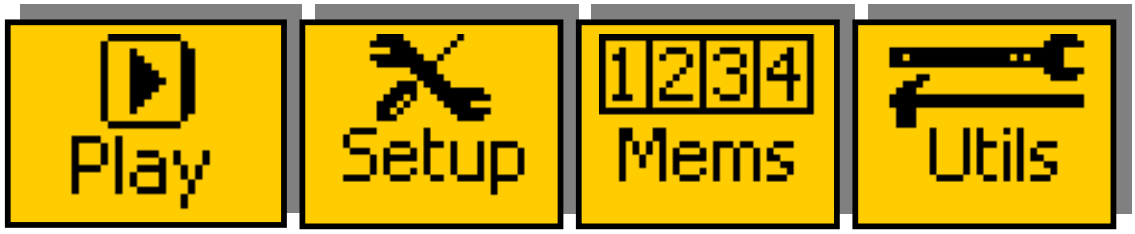
9) which enables greater flexibility of products on the I-Bus network whilst using the same protocols as the RS422 port. Please refer to the “User guide for the DG-9 eyeheight dongle and set-up software.

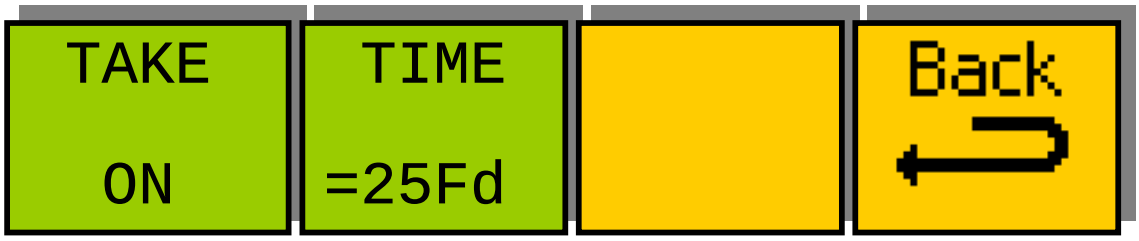
3.3 Operational Menus for the DK-3

Menus 00-03 Top Level Menus



Menu Num.	Heading	Automation	Function
00	PLAY	none	Go To the main Play menus (4-7)
01	SETUP	none	Go To the main Set-up menus (84-87)
02	MEMS	none	Go To the Memory menus (16-47)
03	UTIL	none	Go To the main Utility menus (108-111)

Menus 04-07 PLAY Menus



Menu Num.	Heading	Automation	Function
04	TAKE	1=take off 2=take on	This Causes the Auto Transition to occur. The On/Off state is also indicated in the window.
05	TIME	1-200	This is the Key Transition time. The time taken for the key to fade on or off in auto transition mode
06			
07	BACK	none	Go To the Top Level Menus

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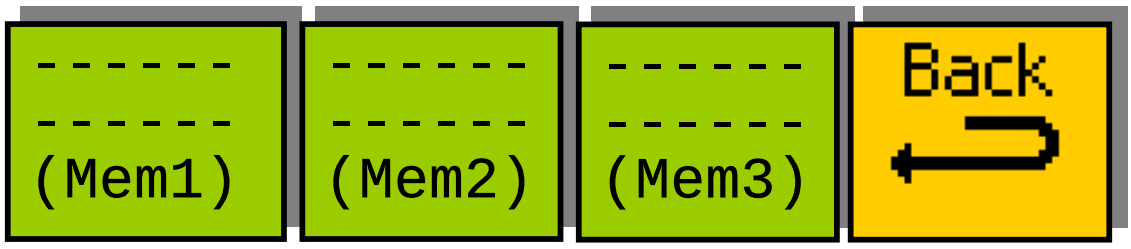
Menus 08-11 System set-up menus (For Automation use only)

Menu Num.	Heading	Automation	Function
08	K.GAIN	0-511 (Default is 299)	This sets the key gain. 100% represents unity key gain (default).
09	K.LIFT	-128-511 (Default is –64)	This sets the key lift. 0% represents no lift (default)
10	KEY:	0=normal 1=invert key	This inverts the key signal.
11	BACK	none	Go To the Top Level Menus

Menus 12-15 System set-up menus (For Automation use only)

Menu Num.	Heading	Automation	Function
12	BG POS	Level A 0-15. Default=7 Level B 0-15. Default=7	When this button is pressed to "Green", the window indicates shows two options, which can be changed by adjusting the two rotary digipots A and B. Digipot A moves the position of the background picture relative to the key and the foreground. Digipot B moves the position of the key relative to the foreground and the background.
13	L= H= S=	Menu Level “A” 0-255 (L) Menu Level “B” 0-255 (H) Menu Level “C” 0-255 (S)	Press this button and the three digipots indicated by the lit LED’s will change the Luma, Hue and Saturation of the Matte colour.
14	KEYING	0=normal 1=additive 2=self key 3=colour Fill	This changes the keying mode. “Normal” is the default mode. “Additive” is selected for an Additive Key mode. “Self” is selected for Self Key mode where the key is derived from the foreground input. Colour Fill mode provides an internal Matte Fill.
15	BACK	none	Go To the Top Level Menus

Menus 16-19 Memory 1→3 menus (NEXT to navigate)



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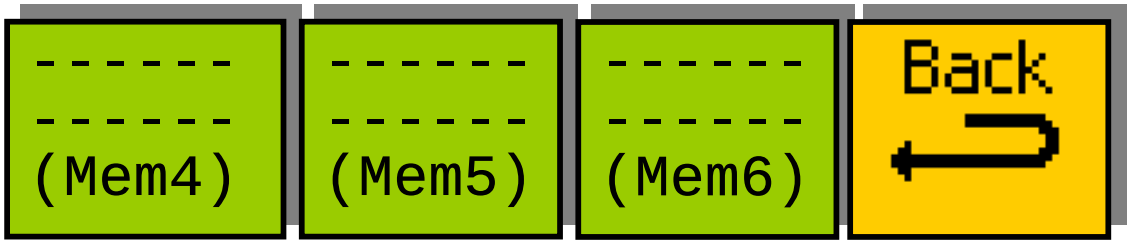
Menu Num.	Heading	Automation	Function
16	MEM1	1=Recall	Pressing this will recall Memory number 1.User Names can be programmed in to the memories using a keyboard. See “geNETics User guide”, section “Giving product Memories names”
17	MEM2	1=Recall	Pressing this will recall Memory number 2.
18	MEM3	1=Recall	Pressing this will recall Memory number 3.
19	BACK	none	Go To the Top Level Menus

Menus 20-23 Memory 4→6 menus (NEXT/PREV to navigate)



Menu Num.	Heading	Automation	Function
20	MEM4	1=Recall	Pressing this will recall Memory number 4.
21	MEM5	1=Recall	Pressing this will recall Memory number 5.
22	MEM6	1=Recall	Pressing this will recall Memory number 6.
23	BACK	none	Go To the Top Level Menus

Menus 24-27 Save memory 1→3 menus (NEXT/PREV to navigate)

Menu Num.	Heading	Automation	Function
24	SAVE MEM1	1=Save	Pressing this will Save Memory number 1.
25	SAVE MEM2	1= Save	Pressing this will Save Memory number 2.
26	SAVE3	1= Save	Pressing this will Save Memory

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	MEM3		number 3.
27	BACK	none	Go To the Top Level Menus

Menus 28-31 Save memory 4→6 menus (NEXT/PREV to navigate)

Menu Num.	Heading	Automation	Function
28	SAVE MEM4	1= Save	Pressing this will Save Memory number 4.
29	SAVE MEM5	1= Save	Pressing this will Save Memory number 5.
30	SAVE MEM6	1= Save	Pressing this will Save Memory number 6.
31	BACK	none	Go To the Top Level Menus

Menus 32-35 Power on memory menus

Menu Num.	Heading	Automation	Function
32	Set As Pow On Memory	1=Set	Pressing this will set the current system set-up as the Power on memory default.
33	Recall Pow On Memory	1=Recall	Pressing this will recall The Power-on memory set up in the last menu.
34	Total Reset	1=Reset	Pressing this will cause a first Birthday of the unit. All current memories and settings will be lost.
35	BACK	none	Go To the Top Level Menus

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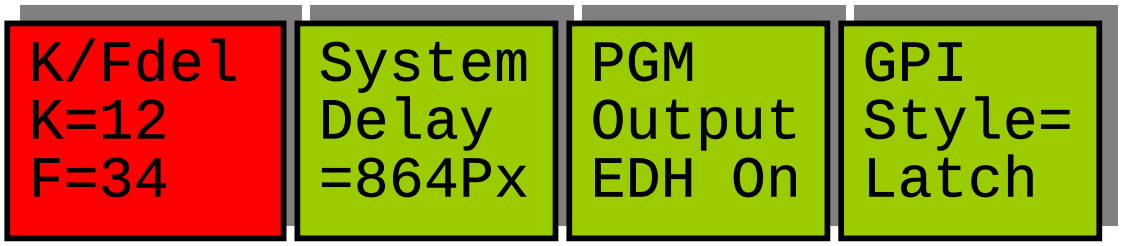
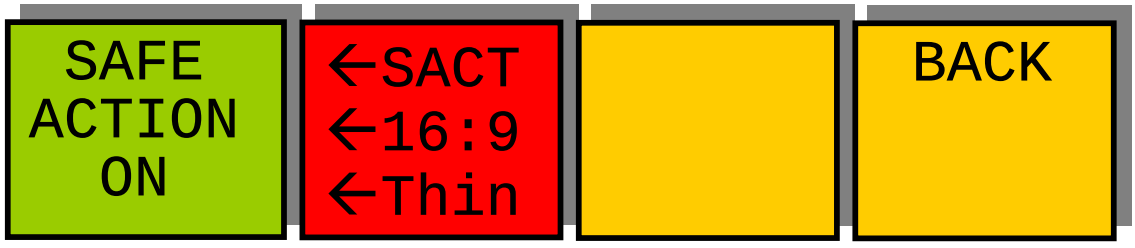
Menus 36-39 Key timing menus



Menu Num.	Heading	Automation	Function
36	Key and Fill delay	none	This is the Relative timing of the “FG” input relative to the “BG” Input and the “Key” input relative to the “BG” Input.
37	Timing	0-1727	This changes the system delay through the unit. The default is ½ of a video line (32uS=864 pixels). The user can make this smaller or larger. If the delay is made smaller, the system delay becomes smaller but also the synchronising range becomes smaller. This becomes a compromise between synchronising range and delay.
38	PGM:	0=EDH Off 1=EDH On	Re-insert EDH Control (Off/On)
39	GPI Style	0=Latched 1=Momentary	Controls the operation of GPI1 and 2 Latched – Take action is toggled ON and OFF when GPI1 is toggled ON and OFF Momentary – When GPI1 is toggled ON Take is set to ON, when GPI2 is toggled ON Take is set to OFF

Menus 40-43 Preview safe area generator



Menu Num.	Heading	Automation	Function
40	SAFE ACTION	None	This Switches on and off the currently selected area. Pressing the "Red" switch next to this one and adjusting the rotary digipots with the lighted green LED's chooses the Selected

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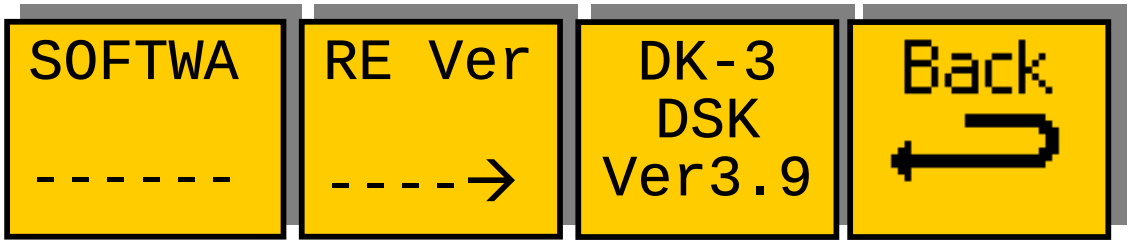
			area.
41	None	Menu Level “A” 0=S.Action 1=S.Capt. 2=DigEdge 3=An Edge Menu Level “B” 0=4:3 1=16:9 2=16p4:3 3=16p149 4=43p16:9 **Menu Level “C”** 0=Thin 1=Thick 2=Shade 3=Black	When this button is pressed to "Green". The Three-line display in the window indicates the three options, which can be changed by adjusting the three rotary digipots A, B and C. <u>Digipot A</u> Determines the basic Function Selects "Safe Action" option Selects "Safe Caption" option Selects "Digital Edge" option Selects the "An. Edge" option <u>Digipot B</u> Determines the Screen Format Standard 4:3 Screen Standard 16:9 Screen 16:9 Shoot to protect 4:3 16:9 Shoot to protect 14:9 (*) 4:3 Shoot to protect 16:9 (*) (*) -- Not available in 525 <u>Digipot C</u> Determines the Style of Indicate Thin White lines are used Thick White lines are used Shade is used for "danger area" Black is used for "danger area"
42	PGM:	0=EDH Off 1=EDH On	Re-insert EDH Control (Off/On)
43	BACK	none	Go To the Top Level Menus

Menus 44-47 Software version menu



Menu Num.	Heading	Automation	Function
44	Info	none	Information
45	Info	none	Information
46	none	none	Software Version Information
47	BACK	none	Go To the Top Level Menus

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Menus 48-51 Keyer transition time menus (For Automation use only)

Menu Num.	Heading	Automation	Function
48	info	none	info
49	info	none	info
50	Transition Time	1→200	Changes the Key Transition Time.
51	info	none	info

Menus 52-55 Keyer transition type menus (For Automation use only)

Menu Num.	Heading	Automation	Function
52	TRANS	0=Mix 1=Wipe 2=Cut 3=Mix+Wipe	This sets the transition type between Mix, Wipe and Cut and Mix+Wipe. Mix+Wipe does a simultaneous Mix with the selected wipe pattern.
53	WIPE (Pattern)	0=Vertical 1=Horiz 2=Vert Curtain 3=Horiz Curtain 4=Diagonal 5=Diamond 6=Arrow Left 7=Arrow Up	This shows a representation of the shape of the currently selected Wipe Transition.
54	Wipe Softness	1→49	This adjustment softens the wipe edge.
11	BACK	none	Go To the Top Level Menus

Menus 56-59 Utility Menus: (For Automation use only)

Menu Num.	Heading	Automation	Function
56	Garbage Matte Control	0=Off 1=On 2=Invert	This is a box shaped Garbage Matte that can be used to Box out unwanted Key Spill.
57	Box LR	Menu Level “A” L=0→719 Menu Level “B” R=0→719	This is the Left and Right position adjustment for the garbage matte box
58	Box TB	Menu Level “A” L=0→575 Menu Level “B” R=0→575 (For 525=487)	This is the Top and Bottom position adjustment for the garbage matte box
59	BACK	none	Go To the Top Level Menus

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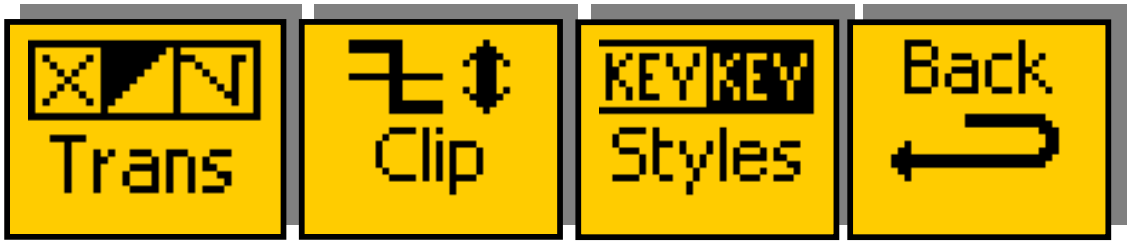
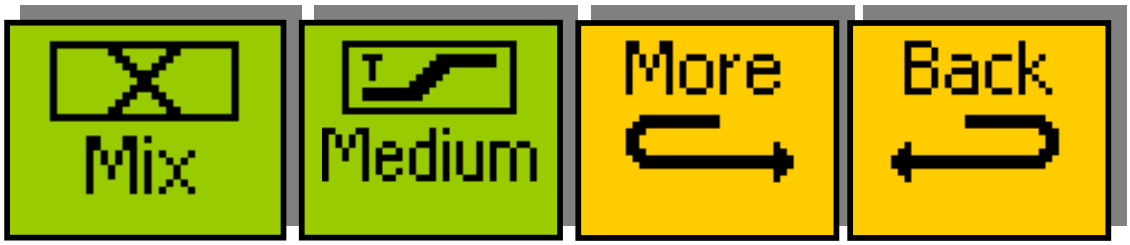
Menus 84-87 Keyer set-up menus



Menu Num.	Heading	Automation	Function
84	Transition	none	Go To the main Trans menus (92-95)
85	Clip and gain	none	Go To the main clip menus (96-99)
86	Styles	none	Go To the styles menus (104-107)
87	Back	none	Go To the main top menus (0-3)

Menus 92-95 Key transition menus



Menu Num.	Heading	Menu Options	Function
92	Transition type	0=mix 1=wipe 2=cut 3=wipe+mix	This changes the type of transition, which is the way in which the keyed in source appears.
93	Transition Speed	0=fast 1=medium 2=slow 3=user	This changes the speed of the transition.
94	More		This takes you to menus 88→91 which further configure the mixer transitions.
95	Back		This takes you back to menus 84-87

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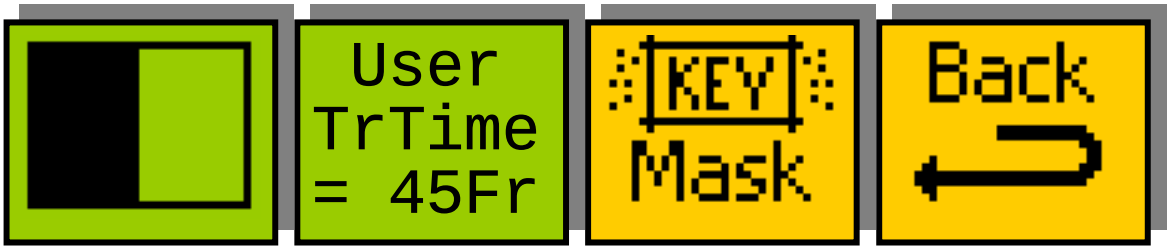
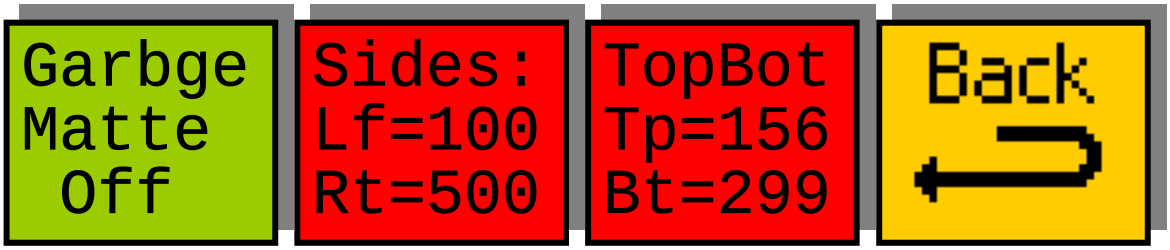
Menus 88-91 more key transition menus



Menu Num.	Heading	Menu Options	Function
88	Wipe pattern	0= vertical wipe 1= horizontal wipe 2=vertical curtain 3=horizontal curtain 4=diagonal wipe 5=diamond wipe 6=horizontal arrow 7=vertical arrow	This changes the type of wipe pattern when wipe is selected as the key transition.
89	User Transition Time	User Tran Time 3→253.	This changes the transition time of the “user” setting for menu 93
90	Mask		This takes you to the key mask menus (100→103)
91	Back		This takes you back to menus 92→95.

Menus 100-103 Garbage matte (mask) menus



Menu Num.	Heading	Menu Options	Function
100	Garbage matte (mask)	0= Off 1= On 2=Invert	This switches on the garbage matte. The garbage matte allows you to configure a “box” within the picture outside of which NO keying is visible. With the “invert” option no keying is possible INSIDE the box.

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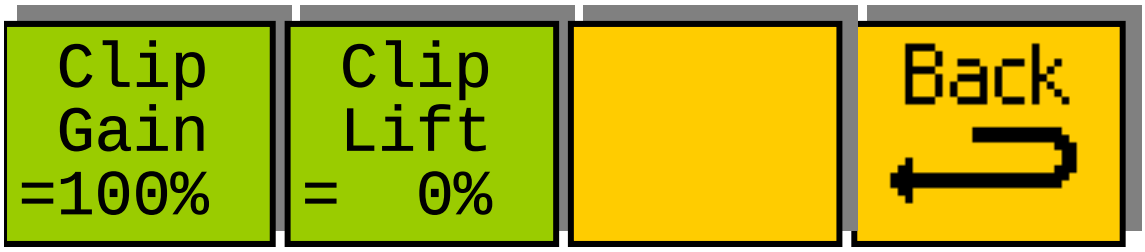
101	Sides of garbage matte box	**Level A:** Left edge of garbage matte (0→719) **Level B:** Right edge of garbage matte (0→719)	Pressing this button will make the three rotary digipots A and B active: Digipot A will change the garbage matte box top edge. Digipot B will change the garbage matte box bottom edge.
102	Top and bottom of garbage matte box	**Level A:** Top of garbage matte (0→575) **Level B:** Bottom of garbage matte (0→575)	Pressing this button will make the three rotary digipots A and B active: Digipot A will change the garbage matte box top edge. Digipot B will change the garbage matte box bottom edge.
103	Back		This takes you back to menus 88→91.

Menus 96-99 Key clip and gain menus



Menu Num.	Heading	Menu Options	Function
96	Clip Gain	Gain=0→511 (299=100%,0=0%)	This adjusts the key gain.
97	Clip Lift	Lift=0→511 (363=100%,64=0%)	This adjusts the key lift.
98			
99	Back		This takes you back to menus 84→87

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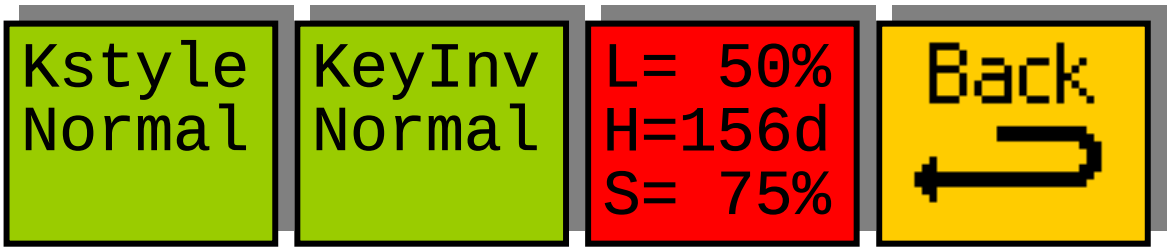
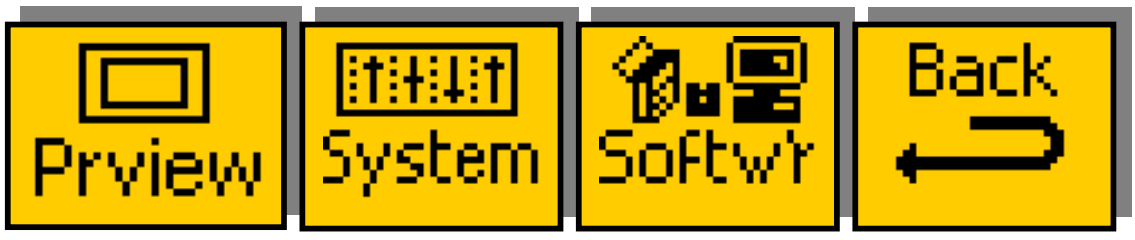
Menus 104-107 Key style menus



Menu Num.	Heading	Menu Options	Function
104	Key Style	0= normal 1= additive 2=self key 3=colour fill	This switches between keying styles. Normal is multiplicative keying Additive keying is used for key sources with an anti aliased fill AND key (most character generators). Self Key uses the Fill as the Fill AND key source Colour Fill, replaces the Fill source with a matte generator.
105	Key Invert	0= normal 1= invert	This inverts the key source if invert is selected.
106	Colour fill Matte.	**Level A:** Border Luminance, 0→255 **Level B:** Border Hue, 0→255 **Level C:** Border saturation, 0→255	Pressing this button will make the three rotary digipots A,B and C active: Digipot A will change the colour fill matte luminance. Digipot B will change the colour fill matte hue. Digipot C will change the colour fill matte saturation.
107	Back		This takes you back to menus 84→87.

Menus 108-111 Util Menus



Menu Num.	Heading	Automation	Function
108	Preview	none	Go To the main Trans menus (40-

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			43)
109	System set-up	none	Go To the main clip menus (36-39)
110	Software version	none	Go To the styles menus (44-47)
111	Back	none	Go To the main top menus (0-3)

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4 Technical Appendix

4.1 Technical Specification for the DK-3

Number of Inputs	3
Type of Inputs	270Mbit Serial Digital Video Inputs 75 Ohm
Line Length	At least 200 Meters of PSF1/3 (Typically 275 Meters)
Number of Outputs	6 Output BNC's per Card (Configurable).
Type Of Outputs	270Mbit Serial Digital Video Outputs, 75 Ohm, 800mV
Total Number Of BNC Connections	10, consisting of 3 Fixed Inputs and 6 Jumper Configurable outputs. (One BNC not used)
SDI Output Jitter	The system will add less than 0.2UI to the input Jitter. (This is only guaranteed on issue 2 or later cards)
Current Consumption	<800mA at +5V
Size	215mm by 100mm

4.2 Jumpering the I-BUS (CAN-BUS) Termination

The I-BUS Network is the "control system" under which all Products and Panels are networked together. Under certain circumstances it is necessary to terminate the network. This can be done on a Panel or a "Product". To terminate this product, locate J6 on the DK-3 Processor Card supplied which is between U1 (The large square "chip") and the Edge connector. (This is on the half of the card labelled "CHP-100 Spartan2 Processor"). Jumper this with a 2mm link.

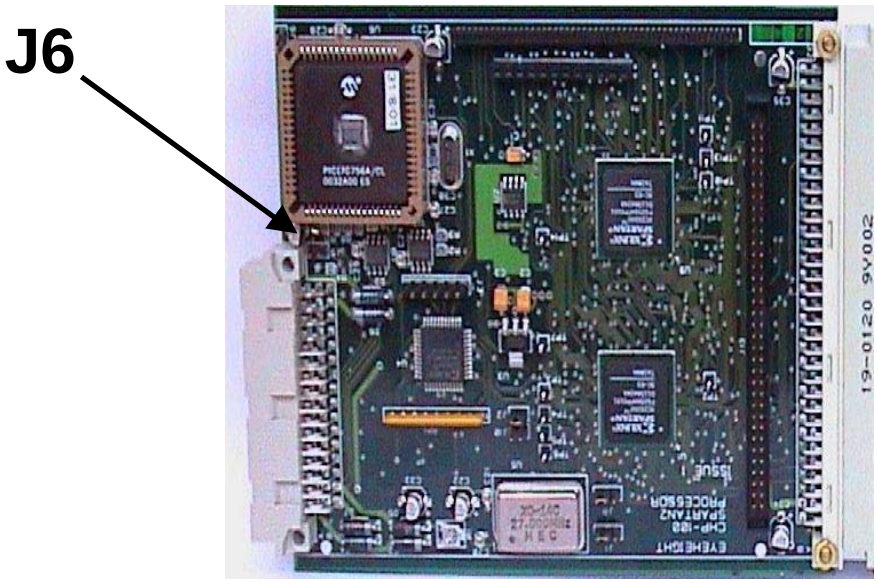

Figure 4-1 Location Of I-Bus Termination Link

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4.3 CHP-100 SDI-TC-GPI Card

4.3.1 Jumper Links on the Timecode and GPI I/O card

Jumper	Function
J2	Set to the Right, SDI Jitter Filtering selection
LK1	Set to Top, Polarity selection for GPI Relay Output#1
LK2	Set to Top, Polarity selection for GPI Relay Output#2
LK3	Set to Top, Polarity selection for GPI Relay Output#3
LK4	Set to Top, Polarity selection for GPI Relay Output#4

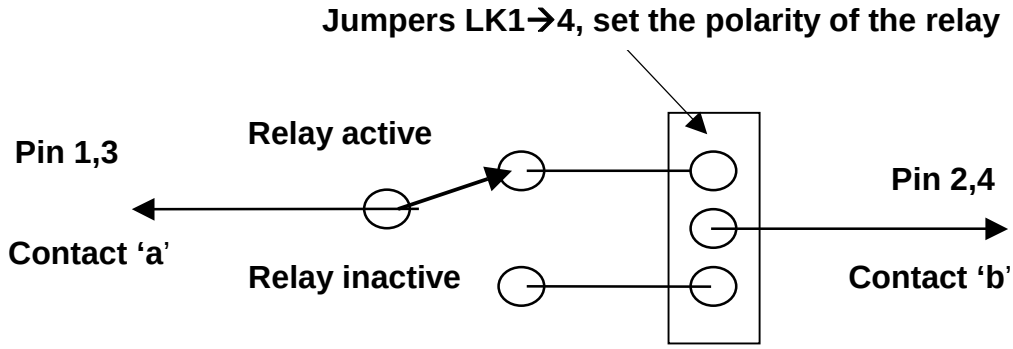

Figure 4-2 Diagram of GPI Output (GPI1-4)

4.3.2 Rear 25W D-Type Pinout

Pin#	Function
1	General Purpose Output Switch #1 contact 'a' (GPO1a). Isolated Relay closure. Relay activated when Take key is ON Tally Out "Key On Air".
2	General Purpose Output Switch #1 contact 'b' (GPO1b). Isolated Relay closure. Relay activated when Take key is ON Tally Out "Key On Air"
3	General Purpose Output Switch #2 contact 'a' (GPO2a). Isolated Relay closure. Relay activated when Take key is OFF Tally Out "Key Off Air"
4	General Purpose Output Switch #2 contact 'b' (GPO2b). Isolated Relay closure. Relay activated when Take key is OFF Tally Out "Key Off Air"
5	Not Used
6	Not Used
7	Not Used
8	Not Used
9	Not Used
10	Not Used
11	Not Used

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12	Not Used
13	General Purpose Input #1 (GPI1). Pull to Ground to activate. Take key ON. Only momentary contact required >50mS. (If GPI Style set to Momentary). Pulled to ground – Take key ON (If GPI Style set to Latched). Open – Take key OFF (If GPI Style set to Latched).
14	General Purpose Input #2 (GPI2). Pull to Ground to activate. Take key OFF. Only momentary contact required >50mS. (If GPI Style set to Momentary)
15	Not Used.
16	Not Used.
17	Not Used.
18	Not Used.
19	Not Used.
20	Not Used.
21	Not Used.
22	Not Used.
23	
24	
25	GND

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